CABLE ASSEMBLY WITH FLAT CABLE

BACKGROUND OF THE INVENTION

1. Field of the Invention

The present invention relates generally to a cable assembly, and more particularly to a low profile cable assembly with a flat cable.

2. Description of the Prior Art

A Video Graphics Array (VGA) connector is a common connector widely used in electric devices. For its terminals being arranged along three rows, cables, such as U.S. Pat. No. 6,350,146 B1 disclosed, connected to the terminals can only be covered by a columniform sleeve. However, present cable assembly always need cables with one end connected to the VGA connector arranged in a line for owning low profile and adapting other connectors which are connected to the other end of the cables.

Hence, in this art, a cable assembly to overcome the above-mentioned disadvantages of the prior art should be provided.

BRIEF SUMMARY OF THE INVENTION

A primary object, therefore, of the present invention is to provide a cable assembly with an improved coupling structure.

In order to implement the above object, a cable assembly comprises an electrical connector, a flat cable, a flexible printed circuit electrically connecting the flat cable to the electrical connector, and a spacer fastened on the electrical connector for supporting the flexible printed circuit. The electrical connector comprises an insulation housing and a plurality of terminals receiving in the housing and each of which has an tail exposed out of the housing. The flexible printed circuit comprises a vertical connecting portion connected to the terminals of the electrical connector and a horizontal connecting portion separated from the vertical connecting portion and connected to one end of the flat cable.

Other objects, advantages and novel features of the invention will become more apparent from the following detailed description of a preferred embodiment when taken in conjunction with the accompanying drawings.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. **1** is a perspective view of a cable assembly in according with the present invention;

FIG. **2** is an exploded, perspective view of the cable assembly in according with the present invention;

FIG. **3** is a view similar to FIG. **2**, but taken from a different aspect;

FIG. **4** is an assembled perspective view of an electrical connector, a flat cable, a flexible printed circuit and a spacer of the present invention.

DETAILED DESCRIPTION OF THE INVENTION

Reference will now be made in detail to a preferred embodiment of the present invention.

Reference to FIG. **1** to FIG. **4**, a cable assembly **100** in according with a preferred embodiment of the present invention is shown. The cable assembly **100** comprises an electrical connector **1**, a flat cable **4**, a flexible printed circuit (FPC) **5**, a spacer **6**, a first cover **2** and a second cover **3**.

The electrical connector **1** comprises an insulation housing **10** with a plurality of receiving holes **102** and a plurality of terminals **12** receiving in the receiving holes **102** and each of which has an tail **120** exposed out of the housing **10**. The housing **10** comprises a main body **104** and a mating portion **106** forwardly extending from the main body **104**. The mating portion **106** is smaller than the main body **104** and has a shell **14** covering the mating portion **106** and assembled on the main body **104**.

The flexible printed circuit **5** is electrically connected the flat cable to the electrical connector **1**, and comprises a vertical connecting portion **52** connected to the terminals **12** of the electrical connector **1**, a horizontal connecting portion **54** separated from the vertical connecting portion **52** and connected to one end of the flat cable **4**, and a gradient connecting portion **56** connecting the vertical connecting portion to the horizontal portion. A strengthening board **548** is formed between the horizontal connecting portion **54** and the spacer **6** for increasing the rigidity of the horizontal connecting portion **54**. The vertical connecting portion **52** comprises a plurality of holes **522** corresponding to the terminals **12** for make the terminals **12** pass through the hole **522** and electrically connected to the vertical connecting portion **52**.

The spacer **6** is fastened on the electrical connector **10** for supporting the flexible printed circuit **5**. The spacer **6** comprises a first vertical receiving space **60** receiving the horizontal connecting portion **54** of the flexible printed circuit **5** and the end of the cable **4**, a second receiving space **64** receiving the gradient connecting portion **56**, and a passageway **62** connecting the first receiving space **60** to make the cable **4** extend out the spacer **6**. The passageway **62**, the first receiving space **60**, and the second receiving space **64** are arranged along a lengthwise direction. The insulation housing **10** comprises a pair of fastening poles **1042** arranged on two sides of the terminals **12**. The vertical connecting portion **52** of the flexible printed circuit **5** comprises a pair of fastening holes **520** corresponding to the fastening poles **1042**. The spacer **6** comprises a pair of fastening troughs **66** arranged on two sides of the second receiving space **64** and corresponding to the fastening poles **1042**. The fastening poles **1042** can pass through the fastening holes **520** and be received in the fastening troughs **66** for fixing the spacer **6** to the electrical connector **1**. The horizontal connecting portion **54** of the flexible printed circuit **5** comprises a plurality of pads **542** arranging in a line and a lengthwise grounding portion **544** separated from the pads **542** and a pair of holes **546** arranged between the pads **542** and the grounding portion **544**. The spacer **6** has a pair of columns **602** formed in the first receiving space **60** thereof and corresponding to the holes **546**. The columns **602** can insert into the holes **546** of the horizontal connecting portion **54** to fasten the horizontal connecting portion **54** on the spacer **6**.

The cable **4** comprises a plurality of coaxial cables **42** and a plurality of wires **44**. Each coaxial cable **42** comprises an inner conductor **420** connected to its corresponding pad **542** and an outer conductor **422** connected to the grounding portion **544**. The wires **44** comprises a plurality of power wires **440** connected to their corresponding pads **542** and a plurality of grounding wires **442** connected to the grounding portion **544**.

The first cover **2** is over-molded on the flexible printed circuit **5**, the spacer **6** and the end of the cable **4**. The insulation housing **10** of the electrical connector **1** comprising a pair of receiving grooves **1044** respectively arranged on an upper surface and a lower surface thereof The first cover **2** comprises a pair of fastening arms **22** fixed in the receiving grooves **1044**. The second cover **3** is over-molded on the first cover **2** to cover the insulating housing **10** and the first cover **2**.